Application of an Innovative Performance Demand Model with Canoe Slalom Athletes and their Coach

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Abstract

We describe how we used the newly developed Performance Demand Model (PDM) with a canoe slalom coach and three junior athletes, preparing for the Junior World Championships. The PDM encourages athletes to think of performance as a process, and identifies the psychological demands that must be met before, during and after competition. It focuses on four Psychological Fundamentals: Mastery Motivation; Decision Making; Execution, and, Teamwork, each grounded in Reversal Theory (Apter, 2001). This article discusses how coaches and athletes applied and benefitted from using the PDM and offers lessons learned for its future use by practitioners.

Applied sport psychologists require a working model of the relationship between mental state and sports performance (Poczwardowski, Sherman, & Ravizza, 2004). Ideally, this will be based on a robust theoretical underpinning and be easily understood by coaches and athletes. The Performance Demand Model (PDM: see Males, 2013, 2014) encourages athletes and coaches to view psychological development as a natural process of learning and adaptation (Balish, Eys, & Schulte-Hostedde, 2013), and avoids any sense that the athlete is being "treated" for a deficit. Two key elements facilitate this adaptation. First the athlete and coach identify the specific psychological demands that a competitor must face, and successfully overcome, through the pre-event, competition and post-event stages of competition. Rather than identifying a single or ideal state of mind for optimal sport performance (e.g., Hanin, 2000), this approach recognises that peak or flow states are not consistently experienced (Swann, Keegan, Piggott, & Crust, 2012) and may not be necessary at all stages of competition. For example, a cricket batsman waiting to come on (pre-event) may not benefit from, or be able to maintain, a flow state for many hours. This state of mind is however essential in the moment the batsman faces a fast bowler (competition). Likewise, a flow state is unlikely to be necessary for a post-event team review, that instead requires reflection and analysis. A process – oriented approach encourages athletes and coaches to develop their own solutions to a commonly understood and contextualised set of challenges across all stages of their event, rather than learn psychological skills out of context.

Second, the PDM approach defines four core psychological capabilities (Mastery Motivation, Decision Making, Execution, Teamwork) performers must draw upon to meet the identified performance demands. These are termed Psychological

Fundamentals (Males, 2013), and their full development will be reported elsewhere. All are grounded in Reversal Theory (RT: Apter, 2001), a comprehensive model of personality, motivation and emotion that has been used in a range of sport psychology research and applied settings (Hudson, Males, & Kerr, 2017). Each Fundamental is defined by Positive Indicators providing evidence that an individual can access the capability. In contrast, Negative Indicators identify behaviours that suggest that the athlete is not able to reliably access the Fundamental.

Mastery Motivation shows through a positive, professional and goal-oriented attitude to both training and competition. Athletes will actively seek out competition and look forward to it as a challenge rather than with any sense of fear or threat. The focus on defining competence in terms of mastery, rather than performance, combined with an orientation towards achieving competence rather than avoiding incompetence, enhances intrinsic motivation. This is consistent with Conroy, Elliot, and Coatsworth (2007) who developed a hierarchical model that integrated achievement motivation with self-determination theory. Positive Indicators include enjoying pre-competition emotions and attending to all aspects of performance such as nutrition, stretching, adequate rest and recovery. Negative Indicators include a lack of self-efficacy, low competitiveness in training, being overly concerned about being liked by others, or failing to challenge oneself. *Decision Making* is the ability to gather and manage information, analyse the demands of the event or competitors, set goals and for teams to agree on tactics. It is relevant post-event when athletes must systematically review their performance and take forward the lessons learned. This is especially relevant in open, dynamic team sports (Kaya, 2014), and our definition also includes the use of mental imagery as a planning aid (e.g., MacIntyre, Moran, Collet, Guillot, Campbell,

Mathews, Mahoney & Lowther, 2013). Positive Indicators include feeling confident and well equipped to make tactical choices and manage risk appropriately. Negative Indicators include making poor or rushed tactical choices or repeating patterns of errors from one event to another. *Execution* is the capacity to be 'in the moment', totally focused on the task at hand, able to make fast responses under pressure despite any distractions. Finely honed skills or tactics are delivered almost automatically with minimal or no cognitive interference (Gardner & Moore, 2006). This is equivalent to flow states (e.g., Csikszentmihalyi & Csikszentmihalyi, 1988; Houge Mackenzie, Hodge, & Boyes, 2011). Positive Indicators include remaining focused and committed throughout the duration of the event. Negative Indicators include excessive efforts to concentrate and analyse leading to "paralysis through analysis", and performing better in training than competition. *Teamwork* is the ability to build and maintain relationships, offer and receive support from teammates, and contribute to an effective team environment. It requires giving and receiving honest feedback. These capabilities are consistent with definitions of emotional intelligence, which has been identified as an important component of successful performance in many domains (e.g., Goleman, 1999). Positive Indicators include putting the team's needs above one's own when necessary. Negative Indicators include being dismissive or disrespectful towards coaches or support staff.

Context

Canoe slalom is a time trial that requires the competitor to paddle their canoe (kneeling with a single blade paddler) or kayak (seated with a double blade paddle) down a 300 m stretch of white-water, through a course marked by up to 20 gates suspended above the river. A two second penalty is added to the paddler's score for

hitting a gate, and a 50 second penalty is added for any missed gates. Slalom is predominately an individual sport, although major championships include a team event in which three boats complete the course together.

The participants in this study were a 52-year-old male coach and three junior athletes; athlete A, a 17-year-old male canoe and kayak paddler, athlete B, a 17-year-old male canoe and kayak paddler, and athlete C, a 17-year-old female canoe paddler.

The coach had been working with the group in a voluntary capacity for approximately three years, and had extensive experience as a competitor but limited formal coach education. He wanted to develop his own understanding of the psychological processes of the sport and to be able to access a common framework or language for himself and his squad. The main contact was between the coach and first author, rather than between athlete and psychologist, both because of logistical reasons and because we believe that psychological interventions are more powerful when integrated with regular coaching input (Harwood & Steptoe, 2013). The intervention took place over five months and focused on the squad's preparation for the Junior World Slalom Championships.

Intervention

We sent the coach definitions of the Psychological Fundamentals and a slalom Performance Demand Model (PDM) previously developed with a highly experienced international slalom coach (Males, 2013). We wanted to ensure that the language was suitable for teenage athletes and so invited and incorporated the coach's feedback (see PDM; Figure 1).

The first author introduced the PDM and explanatory materials to the athletes over the course of two group meetings. We clarified questions from the athletes and elaborated on the definitions of the Psychological Fundamentals to draw out concrete examples to ensure that the athletes understood each component. Specifically, the athletes noted that Mastery Motivation was about "doing my best," "enjoying racing rather than feeling it was something you had to do," and "seeing challenges rather than problems." They also explored the risk awareness component of Decision Making, clarifying that in the context of canoe slalom it didn't necessarily mean being conservative, rather it pointed to the need to "race smart."

The group agreed to explore how the Psychological Fundamentals applied in training sessions and to maintain their own reflections in training diaries. The coach then arranged individual meetings with each of the athletes, to identify each athlete's priority areas by using a colour coded three point rating scale for each behavioural descriptor on the PDM. The rating scale was depicted as: Green means "I consistently display this, it's a real strength," Amber means "I sometimes display this, it needs work" and Red means "I rarely display this, it's a barrier to my performance." Each athlete completed ratings independently then discussed them with the coach. This draws on principles of Performance Profiling (Butler & Hardy, 1992), however it differs from conventional performance profiling in several ways. The PDM adopts a dynamic view of competition and the required capabilities at different competition phases. The capabilities are well defined and understood by coach and athlete, and they are based on a comprehensive psychological theory.

The remainder of the intervention over three months comprised of email and video-conference exchanges between the first author and the coach. The coach shared

observations and questions about applying the PDM and Psychological Fundamentals in training, issues with specific athletes, and team preparation for the upcoming trip to the Junior World Championships. We gave the coach additional background reading and used RT to provide additional insights into the motivational and emotional states experienced by the athletes.

The coach and athletes were already familiar with mental rehearsal and goal setting. The athlete – coach meetings showed that all the athletes rated aspects of Execution amber or red, so we decided to introduce mindfulness practice (e.g., Kabat-Zinn, 2004; Williams & Penman, 2011). Gardner and Moore (2007) showed how mindfulness enhances the capacity for habitual meta-cognitive self-monitoring, self-evaluation and corrective action, which does not involve heightened cognitive activity that attempts to control or modify internal experiences (Carver & Scheier, 1988).

We explained mindfulness to the coach and provided example exercises adapted from Gardner and Moore (2007), suggesting that the coach try these himself then introduce them to the athletes. One of the athlete's parents was a qualified hypnotherapist with a degree in Psychology and offered to assist by leading a group session. We briefed him and he went on to introduce simple awareness techniques to the athletes in a group workshop. Given the squad ethos in which parents provided a range of 'hands on' support, we considered this an ethical intervention.

Evaluation

The Junior World Championships was the main competitive focus and afterwards we sought evaluative feedback from the coach and each of the three athletes. Feedback was based on a common set of questions that were intended to test for

respondent validity (does this approach make sense to you?), consensual validity (do you agree?) and test for deviant cases (what's missing?). We sent the questions to participants in advance of a video-conference call with each one. Interviews were recorded and transcribed.

Coach feedback

The coach had explicitly sought a simple psychological framework to support his coaching input. He reported the value of having a shared language with which to address the psychological elements of racing:

> When I was at the World Champs I could stop on the riverbank as the paddlers were going back up to do another run in training and ask them, "How is your focus?" and they knew what I meant, if I said that to them prior to doing this project it could have meant anything, I might not even have asked the question.

When asked about whether the four Psychological Fundamentals described the core components of mental performance in his sport, the coach could relate the detail to his own competitive experience and to his observations of other athletes. Some of the language was new and, "that took a lot of learning, but as we broke it down and worked through it I could see the application to all of those things to high level performance in both training and competition." He expressed a desire for more "homework" or practical exercises that would help athletes and coaches develop their skills. For example, he liked the use of the mindfulness exercises to foster Execution and wanted more of this type of resource.

The coach's responses raised the need for the materials and approach to be as simple as possible, especially when used with teenage athletes – "we are non-psychologists so the simpler and chunkier it is the better." When asked whether anything was missing, he replied "No, not missing. There's a lot in there, if anything I might say there's too much in there, but nothing missing, no."

The coach believed that the PDM described the competitive challenges accurately, but in hindsight this aspect was not fully exploited, because there were no races during the intervention other than the Junior World Champs. He saw much greater opportunity to refine and apply this approach in the approaching summer domestic season.

Athlete feedback

All the athletes mentioned Mastery Motivation as being particularly important in training because it seemed to help them adopt a disciplined and serious attitude. For example, Athlete A said "Mastery motivation … was the one that had the most impact on my thinking, you could just approach training and ask what am I getting better at and why do I want to get better at it." They also started to evaluate their training performance less in terms of comparisons with each other, and more in terms of seeking to be "the best I can," as Athlete A explained:

> Sometimes I got a little bit focused on beating my team-mates, and then I almost got a bit complacent, like I'm beating them so that's all good, then I'd see someone do something really well and I started thinking I should be able to do that, to execute to the best of my ability rather than just looking at the scoreboard.

Athlete B reported that "I focused on Execution a lot in training especially coming up to Worlds and it definitely helped me with my focus and racing." Athlete A cited how mindfulness practice helped with Decision Making in the pre-event period:

> When I went to look at the course with lots of hustle and bustle going on sometimes I'd try and do a visualization and my mind would run off at a tangent so I'd come back and do some mindfulness and slow myself down and by doing that it's more efficient.

Athlete C had previously engaged in NLP (Neuro Linguistic Programming, e.g., Dilts, Hallbom, & Smith, 1993) based training, and noted that "(the PDM materials) were so much more specific to me and my sport and all the processes I go through in the race and thinking on the start line."

Athletes A and B suggested that Teamwork was the least important of the four Psychological Fundamentals, although their comments also reflect a strong appreciation of effective team communication. It seemed that this was due to the efforts that the coaches and team manager invested in preparation for the Junior Worlds, because as Athlete A noted, "If something had gone wrong it would have been more important. We had such a good team there were no social support issues it all went really smoothly."

Athlete A pointed out that the PDM didn't account for the additional fatigue caused by competing in multiple events at a major championship. The impact of extra events appears to have made it more difficult for this athlete to sustain a positive Mastery Motivation:

> To begin with you're kind of excited, and you feel like you can paddle fast, by the end it had worn off and it was becoming more of a chore than going out and enjoying the feeling, so maybe the overall load could be included (in the PDM).

Conclusions

We have described how we used the PDM to support a practical sport psychology intervention with a coach and three young slalom canoeists. The core definitions of the Psychological Fundamentals were relevant to the sport and applicable in training and competition environments. The feedback on the need to keep the materials as simple as possible is important, and is a reminder of how easy it is for practitioners to take for granted a pre-existing level of psychological knowledge or sophistication (Foster, Maynard, Butt, & Hays, 2015).

Although the participants could identify with and use the Psychological Fundamentals, we are less convinced that they fully appreciated the learning and adaptation principles of the PDM (Balish et al., 2013). Our intention was to help athletes identify the specific intra-personal, inter-personal and environmental challenges throughout competition, and ensure that they could successfully meet and overcome them by applying the Psychological Fundamentals. The athletes interpreted the language of performance 'demands' as 'problems' and for example, suggested that Teamwork was not important because there was no conflict when they trained and travelled together. The absence of conflict might also indicate that the squad was able to successfully demonstrate Teamwork, evidenced by Positive Indicators like "I maintain an honest and open relationship with coaches and support staff." As

principles of positive psychology become more prevalent in sport psychology (Wagstaff & Leach, 2015), these athletes' responses show that it is important to help athletes recognize and build on their strengths as much as identify areas of development.

While the athletes adapted the Psychological Fundamentals into their race-day routine, we missed the opportunity to use the PDM as a framework to address the unfamiliar demands of racing at the Junior World Championships. In future applications athletes and coaches should build up the PDM from first principles to increase their ownership and capture the novel demands of a specific competition.

The intervention met the coach's need for a common language that would allow him to integrate psychology into training and competition. It was useful for the athletes who benefited from developing simple and practical skills that had contextual and personal meaning based on their appraisals of themselves in relation to the Psychological Fundamentals. We learned that the PDM approach has promise and that it would benefit from simplification and a 'ground up' approach for specific situations. The Psychological Fundamentals were validated as a user-friendly description of relevant psychological factors underpinned by RT, a theoretical framework that provided explanatory insight into athlete motivation and behaviour. The PDM speaks to the phenomenological base of RT as it helps athletes to make sense of their own personal experiences within a framework from which to develop practical applications. The PDM is a new approach in the early stages of development that shows considerable promise for use by athletes and coaches. Other research in squash, men's and women's hockey, target shooting and track and field athletics has been completed and several research publications describing this work are

forthcoming. We encourage others to use it and hence develop it further, and offer the following guidelines:

Invite your athletes to map their competition as a process, and identify the pre-event, competition and post-event phases. When does each phase start and end? What marks each transition? How is this affected by different venues, or different competition formats?

Next, ask your athletes to consider the different performance demands they face at each phase. For example, the pre-event phase often requires the ability to decide on a game-plan, to physically and mentally warm up, and to manage high emotions. Use the language of your specific sport.

Finally, introduce and define the Psychological Fundamentals. Explore with your athletes what these mean in your sport, and how each will help their performance throughout each phase of competition. Look for ways to highlight and develop the Psychological Fundamentals as part of regular training sessions.

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Slalom Performance Model	Name:	Date:			
Pre Race					
Mastery Motivation I have a positive attitude to competition – I see racing as a challenge not a threat.					
I feel confident and comfortable in the race-day environment.					
I feel confident in my knowledge and experience of key technical challenges on a course, developed through quality preparation and training					
Decision Making I can assess the specific technical challenges presented by the course design.					
I can develop a race plan to 'solve the problems' posed by the course designers.					
I remain open to late information from coaches about the course and can integrate it into my race plan.					
Teamship I maintain an honest and open relationship with coaches and support staff.					
I contribute to a supportive team environment.					
Competition – during the run					
Mastery Motivation I am motivated to deliver my best possible performance at this moment in time					
I have a confident and positive attitude, focused on my strengths not my weaknesses.					
Execution I focus on the here and now; my next stroke *not* on the race outcome					
I trust in my chosen plan and my technical skills to meet the course's challenges.					
I am fearless and willing to take risks without 'defending a position'.					
I am adaptable to move to alternative tactics and paddle reactively when necessary					
I maintain a steady emotional state.					
After the race					
Mastery Motivation I manage my immediate emotional response to the outcome, whether good or bad.					
Decision Making I rationally reflect and evaluate my performance to identify learning to take into the next run or event.					
Teamship I maintain an honest and open relationship with coaches and support staff.					
I contribute to a supportive team environment					

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360 Figure 1. Performance Demand Model